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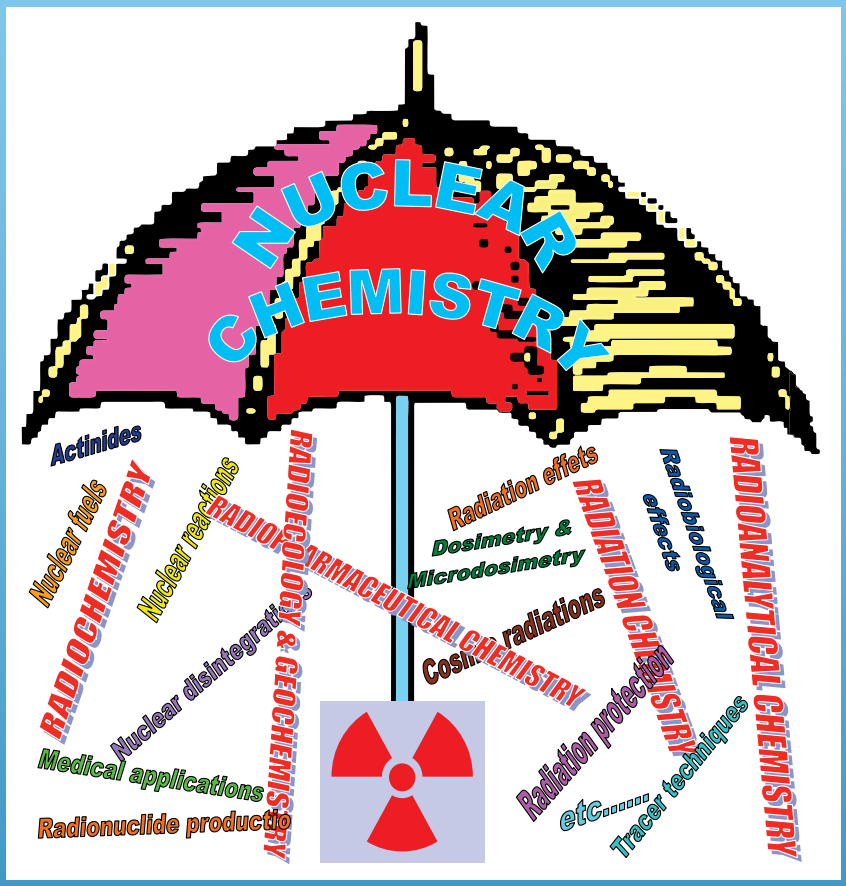

Program
Abstract Book

Edited by

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SUMMARY

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POSTER SESSION 1 - SEP 16 | Tuesday

EDUCATION IN NUCLEAR CHEMISTRY

NUCLEAR AND RADIOCHEMISTRY

NUCLEAR AND RELATED TECHNIQUES

DOSIMETRIC STUDY FOR IRRADIATION PROCESSING OF CHESTNUT FRUITS: EXPERIMENTAL SETUP AND DOSE VALIDATION

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Food irradiation is being used as a feasible alternative in several countries for insects's disinfestation, food decontamination or to increase shelf-life[1]. Therefore our research group developing studies for the preservation of European varieties of chestnut fruits by gamma and e-beam irradiation, reporting its positive influence in some bioactive compounds[2,3]. During irradiation, the estimated dose is usually monitored with routine dosimeters (previously calibrated by standard dosimeters), to assure the desired effects without compromise the main food characteristics, namely color or texture and nutrients composition. In an experimental gamma irradiation chamber with four Co-60 sources and the dimensions of 20x50x65 (WxLxH), a square box of PMMA (polymethylmethacrylate) 15x15x7 cm was positioned inside the chamber, in the 2nd level of an aluminum support built for the effect. The irradiation dose in the box was estimated for different media with three independent dosimetric systems. A standard dosimeter; ionization chamber; a reference dosimeter, liquid chemical Fricke dosimeter; and a routine dosimeter, Amber Perspex, were used to estimate the dose in a media with different densities: air, water and chestnut fruits. For Amber Perspex dosimeters it was also possible to build a phantom with the dosimeter inside the fruit. With those results it was possible to elaborate a dose mapping of the irradiation box, estimating the dose, dose rate and dose uniformity ratio (D_{max}/D_{min}). The results were validated comparing the experimental estimated doses obtained with the three dosimetric systems and using a state-of-art simulation program for radiation interaction with matter[4]. With the isodose maps we can predict the doses and design an irradiation process to irradiate the samples, with or without rotation, to get a better dose uniformity. The results also shown that the dose uniformity ratio obtained is in conformity with the good practices for food irradiation.

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4) S. Agostinelli et al, Nucl. Instr. Meth. Phys. Res. 506 (2003) 250–303.